Executive Summary of Unified Price Indices for Spatial Comparisons

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This thesis proposes a method to measure fine-grained spatial differences in purchasing power. This method exploits the recent availability of computer-generated retail scanner data sets to compensate for the absence of sufficiently detailed pricing data in the national accounts. To correct for regional differences in product availability and quality, it extends the theoretical Unified Price Index (UPI) proposed in Redding and Weinstein (2016) from the temporal to the spatial context. In this formulation, differences in product availability in different places are treated as analogous to differences in product availability at different times due to the "birth" and "death" of products across time.

It provides an example of how to apply this method, by estimating differences in food prices between Michigan counties from information in the Nielsen Retail Scanner Dataset.[1] The estimation of these indices can be divided into three steps. First, spatial UPIs are estimated comparing the cost of living between each pairing of Michigan counties for the 554 different categories of food included in the data. For example, one of these indices might compare the price of bacon in each county, while another might compare prices for fresh fruit, etc. Next, the GEKS method is applied to impose transitivity on each set of comparisons. These product level indices are aggregated into an index reflecting the cost of living for all food using a weighted geometric mean. The weights for each product in this process are the share of total food expenditure that the product accounts for. Finally, superpopulation estimates of the geometric variance of these indices are produced using a cluster bootstrap method. The indices we estimate suggest that the raw prices of food goods are similar between counties in Michigan, with a cross-county standard deviation of about 0.02. When differences in available product varieties are taken into account however, the estimated cost of living in rural areas is consistently higher than the estimated cost of living in more populous counties.

[1] Researcher(s) own analyses calculated (or derived) based in part on data from The Nielsen Company (US), LLC and marketing databases provided through the Nielsen Datasets at the Kilts Center for Marketing Data Center at The University of Chicago Booth School of Business. The conclusions drawn from the Nielsen data are those of the researcher(s) and do not reflect the views of Nielsen. Nielsen is not responsible for, had no role in, and was not involved in analyzing and preparing the results reported herein.